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(54) **HAND ENGAGEMENT INTERFACE**

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USPC 358/1.9

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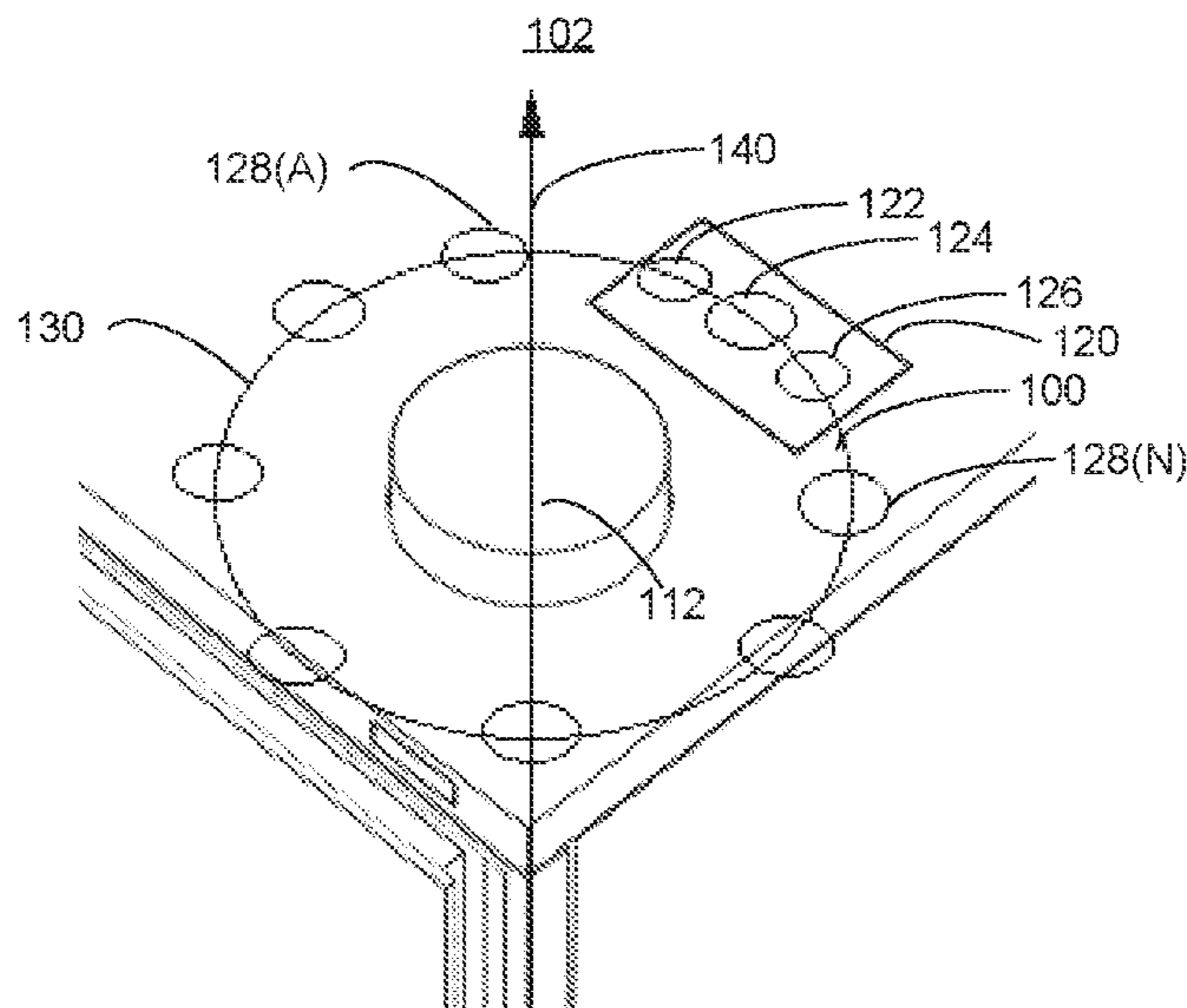
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(57) **ABSTRACT**

Examples disclosed herein relate to displaying, proximate to a hand engagement interface, a plurality of user interface elements, receiving, via a freeform input interface associated with the hand engagement interface, a freeform input from a user, identifying a command associated with a first element of the plurality of user interface elements associated with the freeform input, and updating the display of the plurality of user interface elements according to the command associated with the first element of the plurality of user elements.

14 Claims, 4 Drawing Sheets



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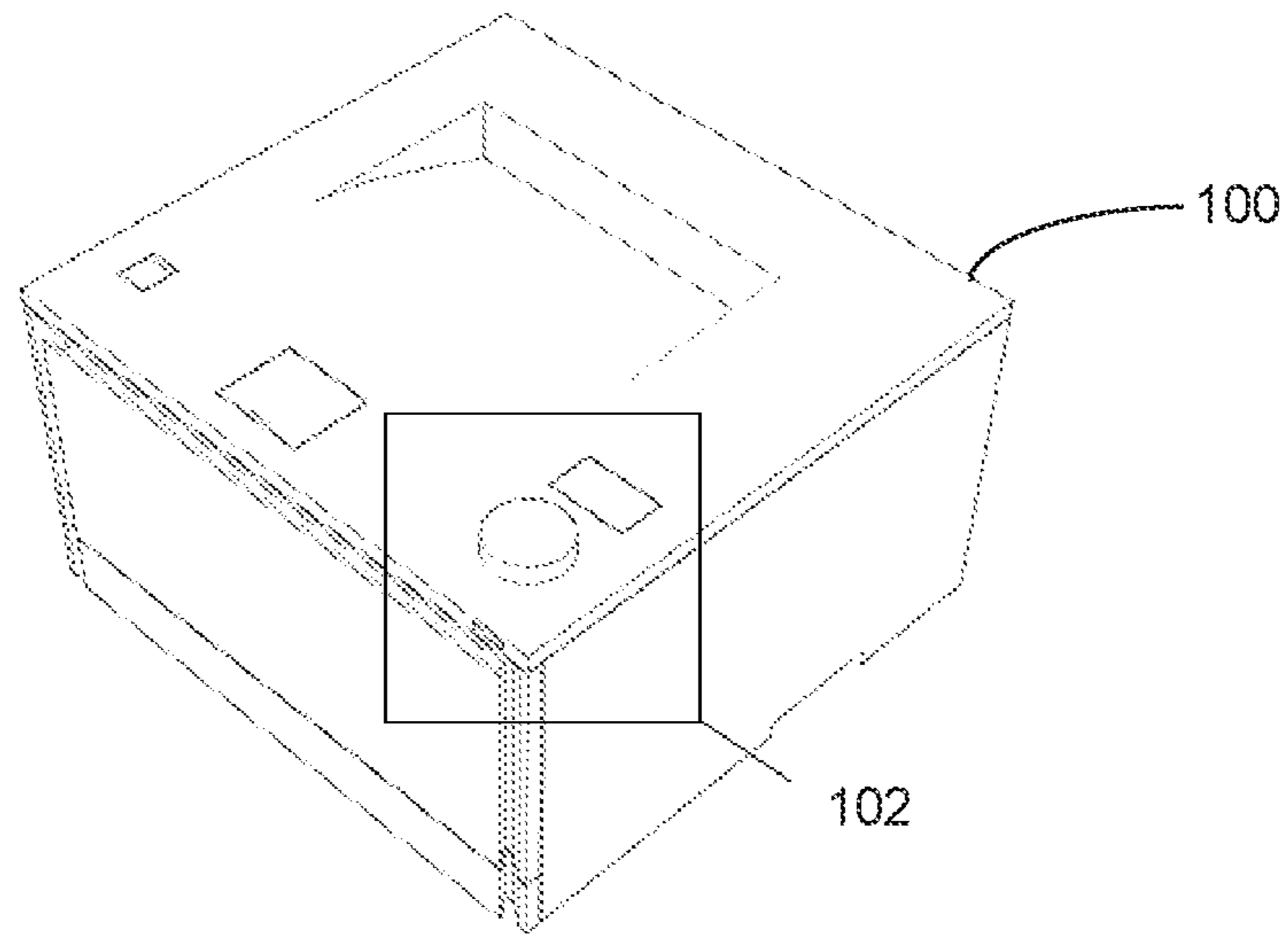


FIG. 1A

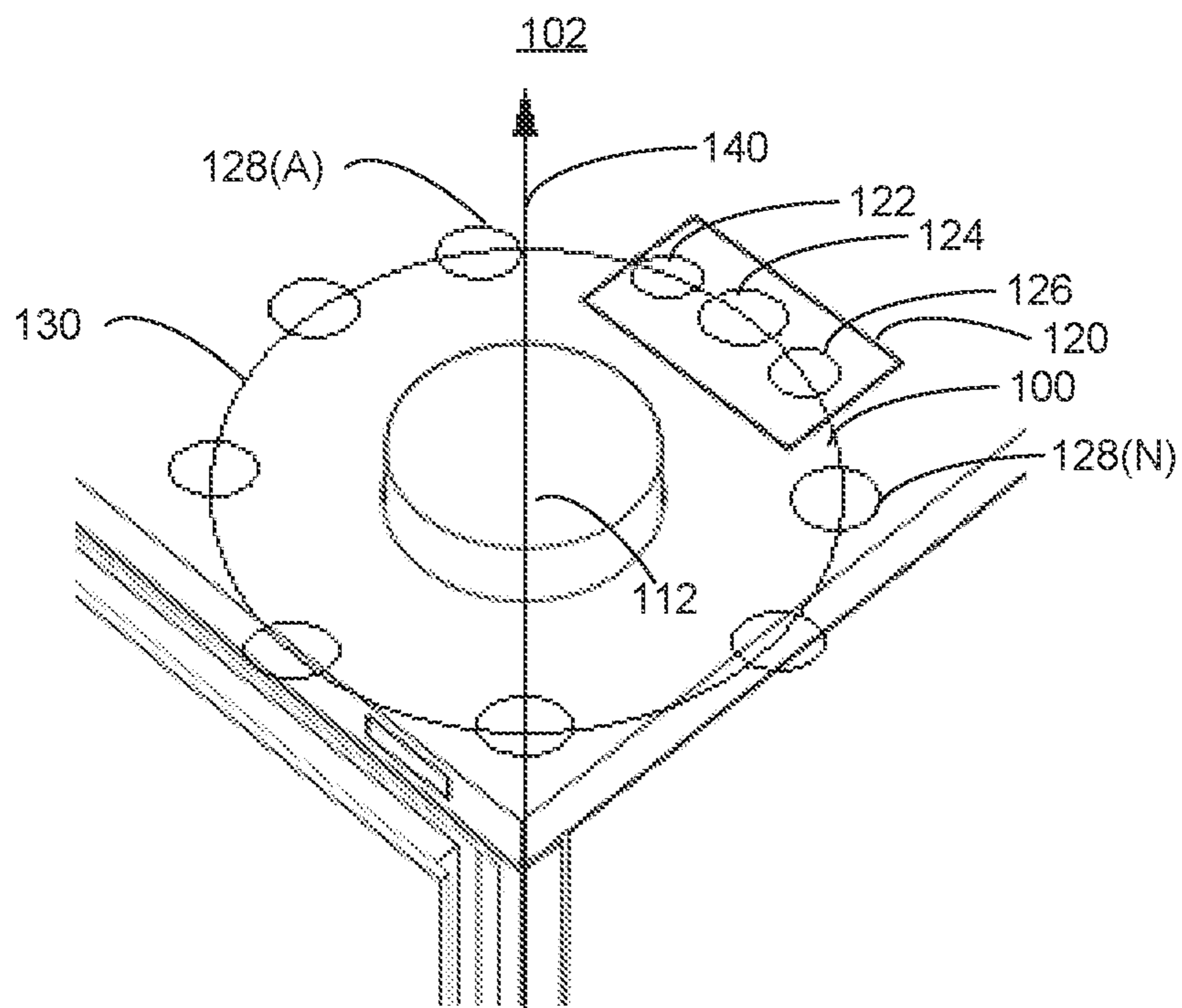


FIG. 1B

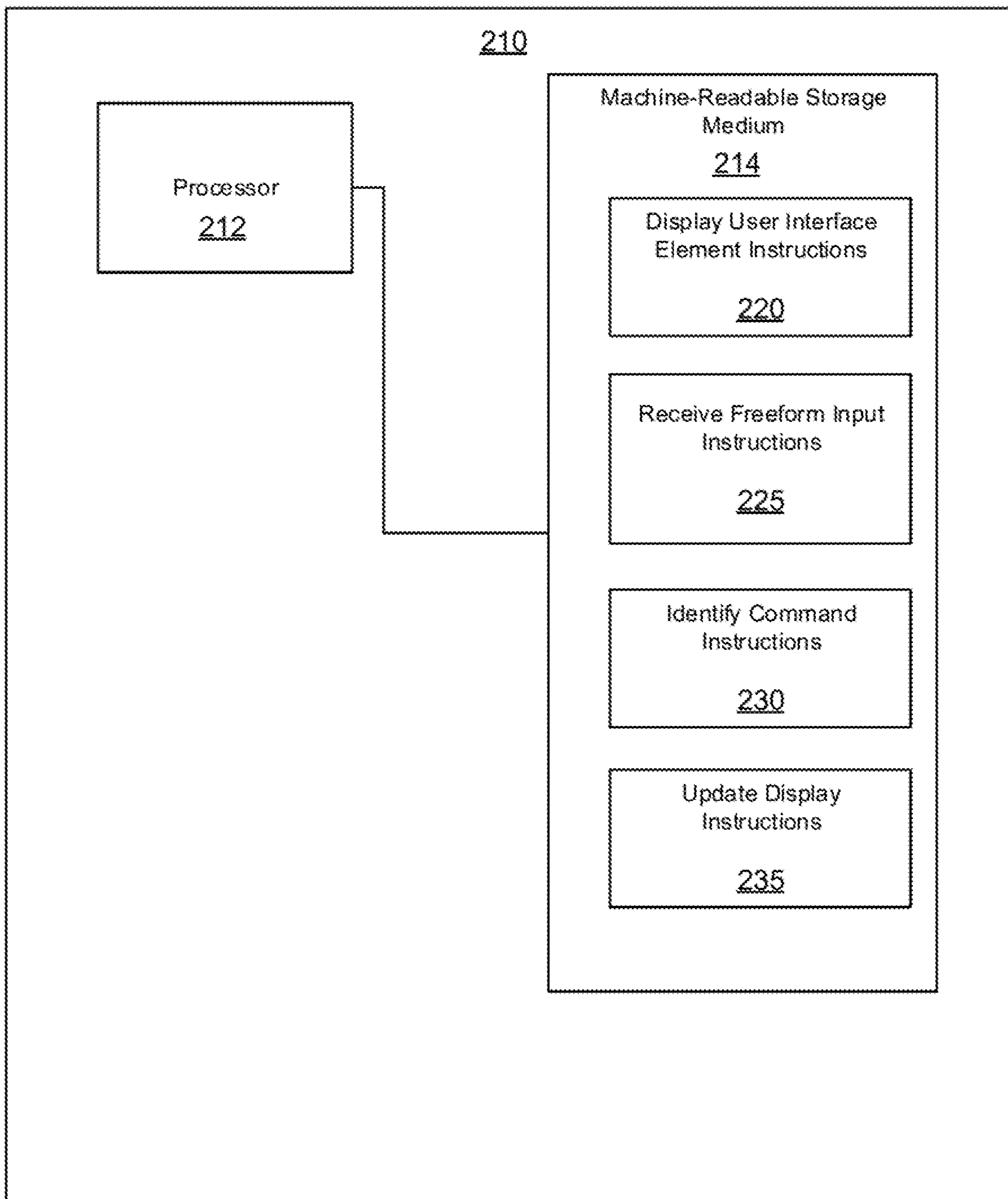


FIG. 2

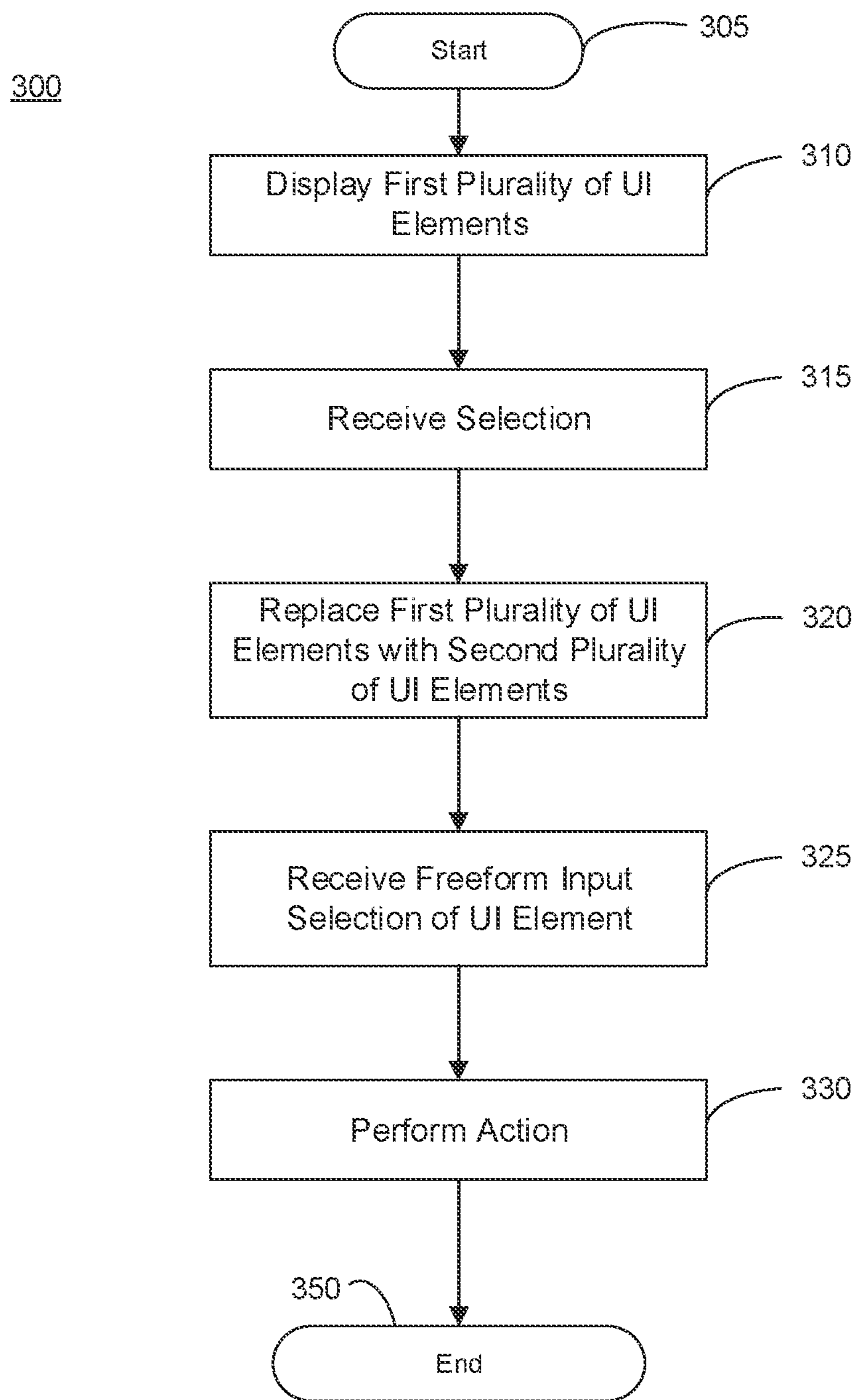


FIG. 3

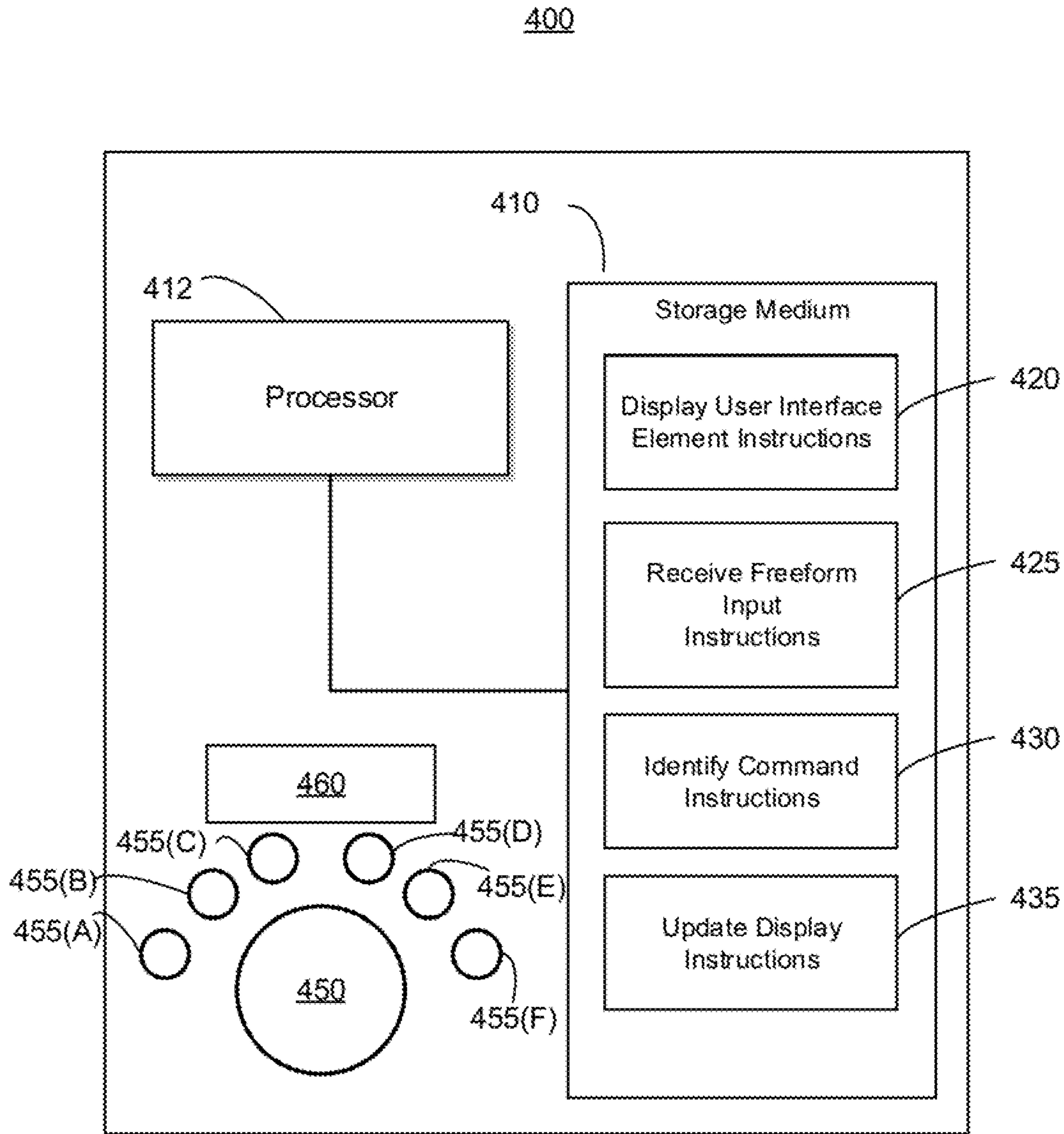


FIG. 4

HAND ENGAGEMENT INTERFACE

BACKGROUND

Multi-function devices often combine different components such as a printer, scanner, and copier into a single device. Such devices frequently receive refills of consumables, such as print substances (e.g., ink, toner, and/or additive materials) and/or media (e.g., paper, vinyl, and/or other print substrates). Often, these devices include a control panel for displaying information and/or receiving commands and other input.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A is an isometric view of an example printing apparatus providing a hand engagement interface.

FIG. 1B is a schematic perspective view of a portion of the printing apparatus of FIG. 1A illustrating an example implementation of a mechanical engagement for a hand engagement interface.

FIG. 2 is a block diagram of an example computing device for providing a hand engagement interface.

FIG. 3 is a block diagram of an example system for providing a hand engagement interface.

FIG. 4 is a flowchart of an example method for providing a hand engagement interface.

Throughout the drawings, identical reference numbers designate similar, but not necessarily identical, elements. The figures are not necessarily to scale, and the size of some parts may be exaggerated to more clearly illustrate the example shown. Moreover the drawings provide examples and/or implementations consistent with the description; however, the description is not limited to the examples and/or implementations provided in the drawings.

DETAILED DESCRIPTION

Most multi-function-print devices (MFPs) provide several features, such as an option to scan a physical document, which may be controlled via an on-device control panel, a connected application, and/or a remote service. Other options may include printing, copying, faxing, document assembly, etc. The scanning portion of an MFP may comprise an optical assembly located within a sealed enclosure. The sealed enclosure may have a scan window through which the optical assembly may scan a document, which may be placed on a flatbed and/or delivered by a sheet feeder mechanism.

Such MFPs may comprise a hand engagement interface including a manual actuator coupled to visual feedback circuitry, and a processor circuit coupled to the manual actuator and the visual feedback circuitry. Manual input from a user may be detected by way of the manual actuator, and responsive to the manual user input, selectable elements is displayed via the visual feedback circuitry. In various implementations, the hand engagement interface may be coupled to a mechanical system, such as a knob, and/or a touch-based system, such as a capacitive touch-sensing display.

FIG. 1A presents an isometric view of an example printing apparatus 100 providing a hand engagement interface 102. FIG. 1B presents a perspective schematic diagram of hand engagement interface 102 of printing apparatus 100 including a manual actuator 112 coupled to visual feedback circuitry by way of a processor circuit and memory. The manual actuator 112 may receive a mechanical user input

from a user. The processor circuit executes machine readable instructions, described in greater detail below, to detect a mechanical user input to the manual actuator 112, which may be, for example, by way of rotation, sliding, pressing, and the like. Responsive to the mechanical user input by the user, the processor circuit may be programmed to execute machine readable instructions to render an image on a display 120 that may include user selectable elements 122, 124 and 126 by way of the visual feedback circuitry. The user is able to execute a control function of the printing apparatus by scrolling through and selecting an element from the selectable elements 122, 124, 126.

As illustrated in FIG. 1B, the manual actuator 112 is presented in the form of a rotatable dial. The actuator 112 may be rotated, and its relative position may be detected, for example, by coupling the dial to a rotational potentiometer, or to a circuit board including a circuit that may be closed when the rotatable dial is in a particular rotational position. Elements (122, 124, 126) may be changed and/or scrolled across the screen in response to user input to the dial.

As illustrated, the processor circuit may execute machine readable instructions to scroll the selectable elements 122, 124, 126 across the display screen along a path responsive to rotation of the rotatable mechanical dial 112. When executed by the processor circuit, the machine readable instructions may cause the selectable elements, such as in the form of various unique selectable elements 128 (A)-128 (N), to appear in a predetermined location along a virtual path 130, for example, as illustrated in FIG. 1B. The virtual path 130 may be a circle, ellipse, rectangle, triangle, serpentine or any other desired shape. When provided in the form of a circle, the virtual path 130 may effectively permit a user to experience the scrolling of the elements as if they were rotating a large dial with selectable elements 128 (A)-128(N) in predetermined locations along the circumference of the virtual circle. The machine readable instructions may cause each elements 128 (A)-128(N) to be assigned to a virtual location along the virtual circle 130. The spacing between the elements 122, 124, 126, 128 (A)-128(N) may be fixed and/or may be varied. If desired, the machine readable instructions may cause a particular elements 124 to be selectable, for example, when it is positioned in a predetermined part of the display 120, such as at the center of the display. As illustrated, the selectable elements 124 may be visually enlarged when displayed in the predetermined part of the display, and adjacent elements 122, 126 may be displayed as being relatively smaller. This may communicate to a user that the enlarged element 124 is the selectable element that a user may select in various ways, described in further detail below.

If desired, the scrolling of the elements 122, 124, 126, 128 (A)-128(N) may be performed in relative synchronization with the rotational displacement of the rotatable dial. In some implementations, this synchronization may be a 1:1 angular synchronization, such that the relative angular displacement of elements along the virtual path 130 is the same as the angular displacement of the dial. For coarser control, the relative angular displacement of the elements as displayed on the display 120 may be larger than the relative angular displacement of the dial. If desired, the virtual path 130 may include multiple virtual layers of selectable elements, by providing a plurality of stacked virtual paths. For example, more than one virtual circle of selectable elements may be provided, such as virtual circles of elements having twelve elements each. When a user scrolls through all twelve elements, a second virtual circle may start to be displayed with a second set of elements, and so forth until a prede-

terminated number of virtual paths have been displayed. By way of further example, to provide finer control, a user may rotate the dial by a relatively larger angle to cause elements to scroll across the display. Thus, in the example of a circular virtual path **130**, two, three, four, or more 360 degree rotations of the rotatable dial may be used in order to traverse the full extent of the virtual path.

As illustrated in FIG. 1B, the device **100** may include machine readable instructions that permit a user to select an enlarged element, or an element that is otherwise differentiated from the other element. This selection by the user of a particular element may be effectuated, for example, by permitting the rotatable mechanical dial to be linearly displaceable along a direction that is parallel to a central rotational axis Z thereof as indicated by the arrow **140** illustrated in FIG. 1B. Thus, a user may depress/push, pull, or otherwise actuate the dial to select the elements, for example, to execute a printer control function. The processor circuit therefore executes the appropriate machine readable instructions to interpret depression of the rotatable mechanical dial as mechanical user input.

In some implementations, the display screen **120** is not responsive to touch input. This is because the display screen **120** is principally used to scroll a listing or menus and submenus of selectable elements. Selection of an individual element may be performed in such instances, for example, by pressing the rotatable dial down, pressing another button or actuator, or the like. However, if desired, in some other implementation, the act of selection of an element that is displayed on the display **120** may be performed by touching the display **120** in the area of the screen where the element is located, or at another predetermined location on the screen. By being able to scroll the elements across the display screen **120**, and permitting a user to select a sub menu, for example, after selecting the elements that in turn includes a further listing of elements, a small display screen **120** may be used to scroll and select among an extremely large number of elements without requiring a large display screen **120**. Thus, the display screen may be, in some implementation, between about one and about three inches across, yet permit the user to select among dozens or even hundreds of elements. In various examples, a larger sized display may be used, as desired.

The display **120** may include any suitable type of display (holographic and the like), and is not limited to a flat panel display that produces a two-dimensional visual image. For example, additionally or alternatively the hand engagement interface may produce haptic feedback to inform a user of various events, such as changing from one element to the next by emitting a sound or vibration, and the like. It will be appreciated however that the display **120** may be an active display that is not preconfigured to display particular icons, but the display **120** may be configured to display an image in any location on its surface. This may be considered to be in contrast to a simplified display that has icons formed into it that light up when a particular circuit is closed. Thus the system overall is reconfigurable and programmable to display different elements in different locations of the screen. As further displayed in FIG. 1B, the hand engagement interface **102**, illustrated as a rotatable mechanical dial, may be physically located or otherwise disposed near the display screen **120** to permit a user's hand eye coordination to facilitate use of the hand engagement interface **102**.

In some implementations, hand engagement interface **102** may comprise a freeform input interface. For example, hand engagement interface **102** may comprise a touchpad configured to receive inputs from a user. For example, the top

surface of actuator **112** may comprise a touch-sensing surface on which a user may enter freeform inputs such as letters, strokes, arrows, shapes, and the like. Such touch-sensing surfaces may comprise, but are not limited to resistive, surface acoustic wave, capacitive, optical imaging, infrared grid, and/or dispersive signal based surfaces. Generally, such surfaces react to a user's touch based on the change of electrical characteristics in the surface. For example, a user wishing to begin a copy operation may draw a "C" on the surface of actuator **112**, causing the processor circuit to execute machine-readable instructions for displaying a set of copy options in display **120** that may be scrolled and/or selected as described above.

For another example, hand engagement interface **102** may comprise a freeform input interface based on an augmented reality interface. A camera and/or other imaging system may operate to capture and process gesture inputs from a user that may be mapped to commands executable by the hand engagement interface **102**. A swipe gesture performed in front of hand engagement interface **102**, for example, may be interpreted as turning a dial type hand engagement interface **102** and result in scrolling elements **122**, **124**, **126** across display screen **120**.

FIG. 2 is a block diagram of an example computing device **210** for providing hand engagement interface. Computing device **210** may comprise a processor **212** and a non-transitory, machine-readable storage medium **214**. Storage medium **214** may comprise a plurality of processor-executable instructions, such as display user interface (UI) element instructions **220**, receive freeform input instructions **225**, identify command instructions **230**, and update display instructions **235**. In some implementations, instructions **220**, **225**, **230**, **235** may be associated with a single computing device **210** and/or may be communicatively coupled among different computing devices such as via a direct connection, bus, or network.

Processor **212** may comprise a central processing unit (CPU), a semiconductor-based microprocessor, a programmable component such as a complex programmable logic device (CPLD) and/or field-programmable gate array (FPGA), or any other hardware device suitable for retrieval and execution of instructions stored in machine-readable storage medium **214**. In particular, processor **212** may fetch, decode, and execute instructions **220**, **225**, **230**, **235**.

Executable instructions **220**, **225**, **230**, **235** may comprise logic stored in any portion and/or component of machine-readable storage medium **214** and executable by processor **212**. The machine-readable storage medium **214** may comprise both volatile and/or nonvolatile memory and data storage components. Volatile components are those that do not retain data values upon loss of power. Nonvolatile components are those that retain data upon a loss of power.

The machine-readable storage medium **214** may comprise, for example, random access memory (RAM), read-only memory (ROM), hard disk drives, solid-state drives, USB flash drives, memory cards accessed via a memory card reader, floppy disks accessed via an associated floppy disk drive, optical discs accessed via an optical disc drive, magnetic tapes accessed via an appropriate tape drive, and/or other memory components, and/or a combination of any two and/or more of these memory components. In addition, the RAM may comprise, for example, static random access memory (SRAM), dynamic random access memory (DRAM), and/or magnetic random access memory (MRAM) and other such devices. The ROM may comprise, for example, a programmable read-only memory (PROM), an erasable programmable read-only memory (EPROM), an

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electrically erasable programmable read-only memory (EEPROM), and/or other like memory device.

Display user interface (UI) element instructions **220** may display, proximate to a hand engagement interface, a plurality of user interface elements. For example, device **210** may comprise hand engagement interface **102** comprising an actuator **112**, such as a dial, and user interface elements such as UI elements **122**, **124**, **126** on a display **120** and/or selectable elements **128 (A)-128(N)**.

Receive freeform input instructions **225** may receive, via a freeform input interface associated with the hand engagement interface, a freeform input from a user. For example, a user may use their finger and/or a stylus to draw on a touch-based freeform input interface and/or may provide a gesture to an augmented reality based freeform input interface.

Identify command instructions **230** may identify a command associated with a first element of the plurality of user interface elements associated with the freeform input. The device **210** may interpret the input and attempt to map it to an available command. For example, a letter drawn on a touch sensitive surface and/or in the air in view of an augmented reality interface may be mapped to a command beginning with that letter. For another example, a tap or thumbs up gesture may be mapped to a confirm command. In some implementations, lists of all freeform inputs received at device **210** and/or across multiple devices of this type may be maintained by a processing service. If a new input is received that is not able to be mapped, device **102** may query the user for more information, such as via display **120**. The user may, for example, draw an unfamiliar gesture in view of the augmented reality input. If device **210** is unable to map that gesture to a command, it may request the user to manually select, via hand engagement interface **102**, the command the user intended. Device **102** may then create a mapping between the gesture and that command for future use.

Update display instructions **235** may update the display of the plurality of user interface elements according to the command associated with the first element of the plurality of user elements. In some implementations, the instructions **235** to update to the display of the plurality of user interface elements may comprise instructions to change a color of at least one element of the plurality of user interface elements. For example, instructions **235** may comprise instructions to identify the at least one element of the plurality of user interface elements most likely to be selected next among the display of the plurality of user interface elements. For example, a user may select a “copy” function. A user interface element associated with selecting a number of copies may be identified as the element most likely to be selected next and its color changed, from yellow to green, for example. The identification of the most likely element may be based on historical analysis of the behavior of the particular user and/or a plurality of users. Such analysis may be based on behaviors observed by device **210** alone and/or a plurality of devices. For example, a fleet of printing devices may upload steps and UI element selections from a workflow for each operation performed by each device, and analytic software may identify probabilistic patterns among those workflows, including the likelihood of any given command being chosen after a particular first command, and enabling that given command to be highlighted by changing the color of its associated UI element.

In some implementations, the instructions **235** to update to the display of the plurality of user interface elements comprise instructions **235** to display a second plurality of

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user interface elements as a replacement for the plurality of user interface elements. For example, a user may rotate hand engagement interface **102** to select element **124**. Elements **122**, **124**, **126** may be removed from the display and replaced with a second set of elements, such as may be associated with a sub menu of commands associated with the first user interface element. For example, UI element **124** may be associated with a “print” command. Upon selection of the print command, elements **122**, **124**, and **126** may be replaced on display **120** with various option commands associated with a print job, such as duplex settings, a mono/color selection, a number of copies setting, etc.

FIG. **3** is a flowchart of an example method **300** for hand engagement interface. Although execution of method **300** is described below with reference to computing device **210**, other suitable components for execution of method **300** may be used.

Method **300** may begin at stage **305** and advance to stage **310** where device **210** may display a first plurality of user interface elements. For example, device **210** may display UI elements **122**, **124**, **126** on a display **120** located near an actuator **112**. Selectable elements **128(A)-(N)** may similarly be displayed on a surface, such as via embedded LEDs, illuminated icons, LCD displays, etc. proximate to the actuator **112**. In some implementations, at least one element of the first plurality of user interface elements and the second plurality of user interface elements is displayed on the freeform input interface associated with the hand engagement device. For example, the surface of actuator **112** may comprise a capacitive touch sensing display surface and may display an UI element such as an icon directly on the actuator. In some implementations, the element may be displayed on the freeform input in order to enable user interaction. For example, a representation of a scanned document may be displayed in a freeform input interface comprising an augmented reality display to enable direct user interaction via gestures, such as selecting portions of the document for highlighting before a file associated with the scanned document is saved.

Method **300** may then advance to stage **315** where computing device **210** may receive, via a mechanical actuation of a hand engagement interface, a selection of a first element of the first plurality of user interface elements.

Method **300** may then advance to stage **320** where computing device **210** may replace the display of the first plurality of user interface elements with a display of a second plurality of user interface elements. For example, instructions **235** may update the display of the plurality of user interface elements comprise instructions **235** to display a second plurality of user interface elements as a replacement for the plurality of user interface elements. For example, a user may rotate hand engagement interface **102** to select element **124**. Elements **122**, **124**, **126** may be removed from the display and replaced with a second set of elements, such as may be associated with a sub menu of commands associated with the first user interface element. For example, UI element **124** may be associated with a “print” command. Upon selection of the print command, elements **122**, **124**, and **126** may be replaced on display **120** with various option commands associated with a print job, such as duplex settings, a mono/color selection, a number of copies setting, etc.

In some implementations, at least one element of the second plurality of user interface elements may be displayed in a different color than the rest of the second plurality of user interface elements. For example, the instructions **235** to update to the display of the plurality of user interface

elements may comprise instructions to change a color of at least one element of the plurality of user interface elements. For example, instructions **235** may comprise instructions to identify the at least one element of the plurality of user interface elements most likely to be selected next among the display of the plurality of user interface elements. For example, a user may select a “copy” function. A user interface element associated with selecting a number of copies may be identified as the element most likely to be selected next and its color changed, from yellow to green, for example. The identification of the most likely element may be based on historical analysis of the behavior of the particular user and/or a plurality of users. Such analysis may be based on behaviors observed by device **210** alone and/or a plurality of devices. For example, a fleet of printing devices may upload steps and UI element selections from a workflow for each operation performed by each device, and analytic software may identify probabilistic patterns among those workflows, including the likelihood of any given command being chosen after a particular first command, and enabling that given command to be highlighted by changing the color of its associated UI element.

In some implementations, replacing the display of the first plurality of user interface elements with the display of the second plurality of user interface elements may comprise replacing only a subset of the display of the first plurality of user interface elements. For example, elements **124** and **126** may be replaced with different elements while element **122** remains the same (e.g., a “Back to Previous Menu” command). In another example, one, some, and/or all of selectable elements **128(A)-(N)** may be replaced while one, some, and/or all of elements **122**, **124**, **126** remain the same.

Method **300** may then advance to stage **325** where computing device **210** may receive, via an input to a freeform input interface associated with the hand engagement interface, a selection of a second element of the second plurality of user interface elements. For example, device **210** may execute receive freeform input instructions **225** to receive, via a freeform input interface associated with the hand engagement interface, a freeform input from a user. For example, a user may use their finger and/or a stylus to draw on a touch-based freeform input interface and/or may provide a gesture to an augmented reality based freeform input interface.

Method **300** may then advance to stage **330** where computing device **210** may perform an action associated with the second element of the second plurality of user interface elements. For example, device **210** may execute identify command instructions **230** to identify a command associated with a first element of the plurality of user interface elements associated with the freeform input. The device **210** may interpret the input and attempt to map it to an available command. For example, a letter drawn on a touch sensitive surface and/or in the air in view of an augmented reality interface may be mapped to a command beginning with that letter. For another example, a tap or thumbs up gesture may be mapped to a confirm command. In some implementations, lists of all freeform inputs received at device **210** and/or across multiple devices of this type may be maintained by a processing service. If a new input is received that is not able to be mapped, device **102** may query the user for more information, such as via display **120**. The user may, for example, draw an unfamiliar gesture in view of the augmented reality input. If device **210** is unable to map that gesture to a command, it may request the user to manually select, via hand engagement interface **102**, the command the

user intended. Device **102** may then create a mapping between the gesture and that command for future use.

In some implementations performing the action associated with the second element may comprise completing an operation. For example, the first UI element selected may comprise a “copy” command and the second element selected (e.g., by the user drawing a “2” on the freeform input interface) may set the number of copies to be produced. Device **210** may then perform the operation of producing two copies of a document provided by the user.

Method **300** may then end at stage **350**.

FIG. **4** is a block diagram of an example printing apparatus **400** for providing hand engagement interface. Apparatus **400** may comprise a multi-function printer device comprising a storage medium **410**, and a processor **412**. Apparatus **400** may comprise and/or be associated with, for example, a general and/or special purpose computer, server, mainframe, desktop, laptop, tablet, smart phone, game console, printer, multi-function device, and/or any other system capable of providing computing capability consistent with providing the implementations described herein. Apparatus **400** may store, in storage medium **410**, display user interface (UI) element instructions **420**, receive freeform input instructions **425**, identify command instructions **430**, and update display instructions **435** as described above.

Apparatus **400** may further comprise a hand engagement interface comprising a rotatable mechanical actuator **450** and a user interface display area comprising a plurality of user interface elements **455 (A)-(F)** and a screen **460**. Any and/or all of actuator **450**, elements **455(A)-(F)**, and screen **460** may be configured as freeform input interfaces operable to receive tactile input from a user. For example, a top surface of actuator **450** may be a touchpad and/or elements **455(A)-(F)** may be displayed on a freeform input interface.

In the foregoing detailed description of the disclosure, reference is made to the accompanying drawings that form a part hereof, and in which is shown by way of illustration how examples of the disclosure may be practiced. These examples are described in sufficient detail to allow those of ordinary skill in the art to practice the examples of this disclosure, and it is to be understood that other examples may be utilized and that process, electrical, and/or structural changes may be made without departing from the scope of the present disclosure.

What is claimed is:

1. A non-transitory machine readable medium storing instructions executable by a processor to:
 - display, proximate to a hand engagement interface of a printing apparatus, a plurality of user interface elements;
 - receive, via a freeform input interface associated with the hand engagement interface, a freeform input from a user, wherein the processor determines:
 - a receipt of the freeform input in response to a touch-based input at the freeform input interface received from the user; and
 - the receipt of the freeform input in response to an augmented reality based input of an augmented reality interface, the augmented reality interface comprising an imaging system to capture and process a gesture input from the user that is mapped to a command executable by the hand engagement interface, wherein the freeform input interface comprises the augmented reality interface;
 - identify a command associated with a first element of the plurality of user interface elements associated with the freeform input; and

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update the display of the plurality of user interface elements according to the command associated with the first element of the plurality of user elements.

2. The non-transitory machine readable medium of claim 1, wherein the instructions to update to the display of the plurality of user interface elements comprise instructions to change a color of at least one element of the plurality of user interface elements.

3. The non-transitory machine readable medium of claim 2, wherein the instructions to change the color of the at least one element of the plurality of user interface elements comprise instructions to identify the at least one element of the plurality of user interface elements as most likely to be selected next among the display of the plurality of user interface elements.

4. The non-transitory machine readable medium of claim 1, wherein the instructions to update to the display of the plurality of user interface elements comprise instructions to display a second plurality of user interface elements as a replacement for the plurality of user interface elements.

5. The non-transitory machine readable medium of claim 4, wherein the second plurality of user interface elements are associated with a sub menu of commands associated with the first user interface element.

6. The non-transitory machine readable medium of claim 1, wherein the freeform input received from the user comprises at least one letter drawn on the freeform input interface by the user.

7. The non-transitory machine readable medium of claim 1, wherein the hand engagement interface comprises a rotatable dial.

8. The non-transitory machine readable medium of claim 1, wherein the freeform input interface comprises a touch sensitive surface.

9. A method comprising:
 displaying a first plurality of user interface elements;
 receiving, via a mechanical actuation of a hand engagement interface of a printing apparatus, a selection of a first element of the first plurality of user interface elements;
 replacing the display of the first plurality of user interface elements with a display of a second plurality of user interface elements;
 receiving, via an input to a freeform input interface associated with the hand engagement interface, a selection of a second element of the second plurality of user interface elements wherein the freeform input interface determines:
 a receipt of the freeform input in response to a touch-based input at the freeform input interface received from a user; and
 the receipt of the freeform input in response to an augmented reality based input of an augmented reality interface, the augmented reality interface comprising an imaging system to capture and process a gesture input from the user that is mapped to

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a command executable by the hand engagement interface, wherein the freeform input interface comprises the augmented reality interface; and

performing an action associated with the second element of the second plurality of user interface elements.

10. The method of claim 9, wherein replacing the display of the first plurality of user interface elements with the display of the second plurality of user interface elements comprises replacing only a subset of the display of the first plurality of user interface elements.

11. The method of claim 9, wherein at least one element of the first plurality of user interface elements and the second plurality of user interface elements is displayed on the freeform input interface associated with the hand engagement device.

12. The method of claim 9, wherein at least one element of the second plurality of user interface elements is displayed in a different color than the rest of the second plurality of user interface elements.

13. A printing apparatus, comprising:

a hand engagement interface comprising a mechanical actuator and a user interface display area; and

a processor circuit coupled to the hand engagement interface, wherein the processor circuit executes machine readable instructions to:

display, in the user interface display area, a plurality of user interface elements;

receive, via a freeform input interface associated with the hand engagement interface, an input from a user, wherein the processor circuit determines:

a receipt of the input in response to a touch-based input at the freeform input interface received from the user; and

the receipt of the input in response to an augmented reality based input of an augmented reality interface, the augmented reality interface comprising an imaging system to capture and process a gesture input from the user that is mapped to a command executable by the hand engagement interface, wherein the freeform input interface comprises the augmented reality interface;

identify a command associated with a first element of the plurality of user interface elements associated with the freeform input; and

update the display of the plurality of user interface elements according to the identified command associated with the first element of the plurality of user elements, wherein the instructions to update the display comprise instructions to modify a color of at least one element of the plurality of user interface elements.

14. The apparatus of claim 13, wherein the freeform input interface at least partially comprises the user interface display area.

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